WHAT IS CLAIMED IS:

1. A method of fabricating a semiconductor device, the method comprising:

providing a workpiece;

disposing a first dielectric material over the workpiece;

disposing a second dielectric material over the first dielectric material, the second dielectric material comprising a different material than the first dielectric material, wherein the first dielectric material and the second dielectric material comprise a first insulating layer; and

forming a first pattern in the first dielectric material and a second pattern in the second dielectric material, the second pattern being different from the first pattern.

2. The method according to Claim 1, wherein the second dielectric material comprises a top surface, further comprising:

depositing a conductive material over the patterned second dielectric material and the patterned first dielectric material; and

removing the conductive material from the top surface of the second dielectric material.

3. The method according to Claim 2, wherein removing the conductive material from the top surface of the second dielectric material comprises forming conductive lines in the second pattern of the second dielectric material.

4. The method according to Claim 2, wherein the conductive material forms vias in the first pattern of the first dielectric material.

5. The method according to Claim 4, wherein the vias comprise substantially vertical sidewalls.

6. The method according to Claim 4, wherein the workpiece comprises component regions, wherein at least one of the vias makes electrical contact with a component region of the workpiece.

7. The method according to Claim 6, wherein the workpiece component regions comprise a plurality of conductive lines formed in a dielectric layer.

8. The method according to Claim 7, wherein the conductive lines comprise copper, wherein disposing the first dielectric material comprises disposing a material having a coefficient of thermal expansion (CTE) close to the CTE of the first conductive lines.

9. The method according to Claim 1, further comprising:

depositing a hard mask over the second dielectric material.

10. The method according to Claim 9, wherein depositing the hard mask comprises:

depositing a first mask layer;

depositing a second mask layer over the first mask layer; and

depositing a third mask layer over the second mask layer.

11. The method according to Claim 10, wherein depositing the first mask layer comprises depositing $SiC_x$, $SiC_xN_y$, $SiC_xH_y$, $SiC_xN_yH_z$, or SiCOH, wherein depositing the second mask layer comprises depositing $Si_xN_y$ or $SiO_2$, and wherein depositing the third mask layer comprises depositing a refractory metal nitride.

12. The method according to Claim 11, wherein depositing the first mask layer comprises depositing a layer of $SiC_x$ and a layer of N-$SiC_x$ over the layer of $SiC_x$.

13. The method according to Claim 10, wherein forming the first pattern and the second pattern comprises:

patterning at least the third mask layer with the second pattern;

patterning the third mask layer, the second mask layer and the first mask layer with the first pattern;

transferring the first pattern to the second dielectric material;

removing the third mask layer, the second mask layer and the first mask layer in the second pattern regions;

transferring the first pattern to the first dielectric material; and

removing the second dielectric material in the second pattern regions.

14. The method according to Claim 13, further comprising disposing the semiconductor device in a processing chamber before disposing the first dielectric material over the workpiece; and before removing the second dielectric in the second pattern regions, cleaning the processing chamber while the wafer remains in the processing chamber without etching a material layer of the semiconductor wafer.

15. The method according to Claim 14, wherein cleaning the processing chamber comprises introducing a plasma cleaning gas comprising $O_2$ gas diluted in Ar, He, or $N_2$, and wherein the plasma cleaning gas removes polymer build-up on the processing chamber walls.

16. The method according to Claim 15, further comprising only applying power to an electrode in the chamber during cleaning, wherein the workpiece is not biased during the cleaning method, and wherein the plasma electrode power density applied comprises about 0.1 $W/cm^2$ to 10 $W/cm^2$ at a pressure of about 50 mTorr to 500 mTorr.

17. The method according to Claim 13, further comprising, before removing the second dielectric in the second pattern regions, moving the workpiece to a clean processing chamber.

18. The method according to Claim 13, further comprising:

depositing a cap layer over the workpiece, before disposing the first dielectric material; and

transferring the first pattern to the cap layer.

19. The method according to Claim 18, further comprising forming an adhesion film over a top surface of the cap layer.

20. The method according to Claim 1, further comprising forming an adhesion film disposed over a top surface of the first dielectric layer.

21. The method according to Claim 13, wherein forming the first pattern and the second pattern further comprises:

after patterning at least the third mask layer with the second pattern, depositing an anti-reflective coating over the third mask layer;

depositing a photoresist layer over the anti-reflective coating;

patterning the photoresist layer with the first pattern; and

transferring the first pattern in the photoresist layer to the third mask layer, the second mask layer, the first mask layer, and the second dielectric layer.

22. The method according to Claim 1, wherein disposing the first dielectric material comprises disposing an inorganic material, and wherein disposing the second dielectric material comprises disposing an organic material.

23. The method according to Claim 1, wherein disposing the first dielectric material comprises disposing a material that is etchable selective to the second dielectric material.

24. The method according to Claim 1, wherein disposing the first dielectric material comprises disposing undoped silicate glass (USG), fluorinated silicon glass (FSG), fluorinated tetraethoxysilate (FTEOS), SiCOH, or porous-SiCOH, and wherein disposing the second dielectric material comprises disposing SiLK™ or porous-SiLK™.

25. A method of fabricating a semiconductor device, the method comprising:

providing a workpiece;

forming a first insulating layer over the workpiece;

forming a plurality of first conductive lines in the first insulating layer;

disposing a first dielectric material over the first insulating layer;

disposing a second dielectric material over the first dielectric material, the second dielectric material comprising a different material than the first dielectric material, wherein the first dielectric material and the second dielectric material comprise a second insulating layer;

forming a first pattern in the first dielectric material and a second pattern in the second dielectric material, the second pattern being different from the first pattern;

depositing a conductive material over the patterned second dielectric material and the patterned first dielectric material; and

removing the conductive material from the top surface of the second dielectric material to form a plurality of second conductive lines in the second pattern of the second dielectric material and a plurality of vias in the first pattern of the first dielectric material.

26. The method according to Claim 25, wherein forming the vias comprises forming vias with substantially vertical sidewalls.

27. The method according to Claim 25, wherein at least one of the vias makes electrical contact to a first conductive line.

28. The method according to Claim 25, wherein disposing the first dielectric material comprises disposing an inorganic material, and wherein disposing the second dielectric material comprises disposing an organic material.

29. The method according to Claim 25, wherein disposing the first dielectric material comprises disposing a material that is etchable selective to the second dielectric material.

30. The method according to Claim 25, wherein disposing the first dielectric material comprises disposing undoped silicate glass (USG), fluorinated silicon glass (FSG), fluorinated tetraethoxysilate (FTEOS), SiCOH, or porous-SiCOH, and wherein disposing the second dielectric material comprises disposing SiLK™ or porous-SiLK™.

31. The method according to Claim 25, wherein the first conductive lines comprise copper, wherein disposing the first dielectric material comprises disposing a material having a coefficient of thermal expansion (CTE) close to the CTE of the first conductive lines.

32. The method according to Claim 25, further comprising:

depositing a hard mask over the second dielectric material.

33. The method according to Claim 32, wherein depositing the hard mask comprises:

depositing a first mask layer;

depositing a second mask layer over the first mask layer; and

depositing a third mask layer over the second mask layer.

34. The method according to Claim 33, wherein depositing the first mask layer comprises depositing SiCx, $SiC_xN_y$, $SiC_xH_y$, $SiC_xN_yH_z$, or SiCOH, wherein depositing the second mask layer comprises depositing $Si_xN_y$ or $SiO_2$, and wherein depositing the third mask layer comprises depositing a refractory metal nitride.

35. The method according to Claim 34, wherein depositing the first mask layer comprises depositing a layer of $SiC_x$ and a layer of N-$SiC_x$ over the layer of $SiC_x$.

36. The method according to Claim 33, wherein forming the first pattern and the second pattern comprises:

patterning at least the third mask layer with the second pattern;

patterning the third mask layer, the second mask layer and the first mask layer with the first pattern;

transferring the first pattern to the second dielectric material;

removing the third mask layer, the second mask layer and the first mask layer in the second pattern regions;

transferring the first pattern to the first dielectric material; and

removing the second dielectric material in the second pattern regions.

37. The method according to Claim 36, further comprising disposing the semiconductor device in a processing chamber before disposing the first dielectric material over the workpiece; and before removing the second dielectric in the second pattern regions, cleaning the processing chamber while the wafer remains in the processing chamber without etching a material layer of the semiconductor wafer.

38. The method according to Claim 37, wherein cleaning the processing chamber comprises introducing a plasma cleaning gas comprising $O_2$ gas diluted in Ar, He or N2, and wherein the plasma cleaning gas removes polymer build-up on the processing chamber walls.

39. The method according to Claim 38, further comprising only applying power to an electrode in the chamber during cleaning, wherein the workpiece is not biased during the cleaning method, and wherein the plasma electrode power density applied comprises about 0.1 $W/cm^2$ to 10 $W/cm^2$ at a pressure of about 50 mTorr to 500 mTorr.

40. The method according to Claim 36, further comprising, before removing the second dielectric in the second pattern regions, moving the workpiece to a clean processing chamber.

41. The method according to Claim 36, wherein forming the first pattern and the second pattern further comprises:

after patterning at least the third mask layer with the second pattern, depositing an anti-reflective coating over the third mask layer;

depositing a photoresist layer over the anti-reflective coating;

patterning the photoresist layer with the first pattern; and

transferring the first pattern in the photoresist layer to the third mask layer, the second mask layer, the first mask layer, and the second dielectric layer.

42. The method according to Claim 25, further comprising:

depositing a cap layer over the workpiece, before disposing the first dielectric material; and

transferring the first pattern to the cap layer.

43. The method according to Claim 42, further comprising forming a first adhesion film over a top surface of the cap layer and forming a second adhesion film over a top surface of the first dielectric material.

44. A method of cleaning a chamber that has been used to etch inorganic materials in semiconductor device fabrication, the chamber having polymer build-up on the interior walls thereof, the method comprising:

without removing a semiconductor wafer that has been processed in the chamber, introducing a plasma cleaning gas into the chamber to remove the polymer build-up on the chamber walls without etching a material layer of the semiconductor wafer.

45. The method according to Claim 44, wherein introducing the plasma cleaning gas comprises introducing a gas comprising $O_2$ gas diluted in Ar, He or N2.

46. The method according to Claim 45, wherein introducing the plasma cleaning gas comprises introducing a gas comprising an $O_2$ concentration of about 1% to 20%.

47. The method according to Claim 44, further comprising only applying power to an electrode in the chamber during cleaning, and wherein the wafer is not biased during the cleaning method.

48. The method according to Claim 47, wherein the plasma electrode power density applied comprises about 0.1 W/cm2 to 10 W/cm2 at a pressure of about 50 mTorr to 500 mTorr.

49. The method according to Claim 44, wherein the semiconductor wafer comprises a hard mask formed thereon, wherein the hard mask is not etched or removed during the cleaning method.